

Editorial

Respiratory care in cardiac surgery

Over the past two decades there has been a steady evolution in the practice of adult cardiac surgery with the introduction of "off-pump" surgery. However, respiratory complications remain a leading cause of postcardiac surgical morbidity and can prolong hospital stays and increase costs. The high incidence of pulmonary complications is in part due to the disruption of normal ventilatory function that is inherent to surgery in the thoracic region. Furthermore, patients undergoing such surgery often have underlying illnesses such as intrinsic lung disease (e.g., chronic obstructive pulmonary disease) and pulmonary dysfunction secondary to cardiac disease (e.g., congestive heart failure) that increase their susceptibility to postoperative respiratory problems. Given that many patients undergoing cardiac surgery are thus susceptible to pulmonary complications, it is remarkable that more patients do not suffer from them during and after cardiac surgery. This is to a large degree because of advances in anesthetic, surgical and critical care that, for example, have reduced the physiological insults of surgery (e.g., better myocardial preservation techniques) and streamlined care in the immediate postoperative period (e.g., early extubation). Moreover, the development of minimally invasive surgery and nonbypass techniques are further evidence of the attempts at reducing the homeostatic disruptions of cardiac surgery.

In this new era of managed care, the emphasis has been on the reduction of intensive care stay after coronary artery bypass surgery. "Fast-track" or rapid weaning protocols have become increasingly popular due to evidence that shows their cost-effectiveness and safety. With new advances in surgical and anesthetic techniques, the goal is often to have patients extubated within 4 to 6 hours upon arrival in the intensive-care unit. Patients who are not candidates for the fast-track protocol are often those who either have poor respiratory function and a large A-a gradient or those

who have hemodynamic instability from poor cardiac function after bypass. These patients need more intensive care and more traditional weaning from mechanical ventilation. Those that are not able to wean from the mechanical ventilator within a few weeks are candidates for tracheostomy in order to avoid complications from prolonged endotracheal intubation and to improve pulmonary toilet.

Pulmonary dysfunction is one of the most common and serious complications after cardiac surgery and can significantly impact on patient outcomes and health economics. The mechanisms involved in the development of pulmonary dysfunction are multifactorial and are related to the activation of different inflammatory and oxidative stress pathways. Clinical manifestation varies from mild atelectasis to severe respiratory failure. Managing pulmonary dysfunction post cardiac surgery is a multi step process that starts before surgery and continues during both the operative and postoperative phases. Pulmonary protection strategies have evolved over the years with various degrees of success. The main weakness of the majority of studies is often being observational in nature, small sample size, or being concentrated on a single intervention. Managing pulmonary dysfunction needs to be a multistep process involving more than one modality for each step of the surgical pathway. A better understanding of available modalities and/or combinations will result in the development of customised strategies for the different cohorts of patients. This in turn will help reduce pulmonary dysfunction and hence improve early outcome and costs after cardiac surgery.

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